Published in final edited form as:
J Adolesc Health. 2012 September ; 51(3): 233–241. doi:10.1016/j.jadohealth.2011.12.012.

Cash, cars, and condoms: Economic factors in disadvantaged adolescent women's condom use

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Abstract

Purpose—Evaluate whether adolescent women who received economic benefits from their boyfriends were more likely never to use condoms.

Methods—Data is from a longitudinal HIV prevention intervention study with 715 African-American adolescent women in urban Atlanta surveyed at baseline, 6 months, and 12 months. The primary outcome was never using condoms in the past 14 and 60 days at 6 and 12 months. The primary predictor was having a boyfriend as primary spending money source at baseline. Analysis minimized confounding using propensity weighting to balance respondents on 81 variables.

Results—A boyfriend was primary spending money source for 24% of respondents, who did not differ in neighborhood or family context but had lower education, more abuse history, riskier sex, and more sexually transmitted infections. After propensity score weighting, no statistically significant differences for 81 evaluated covariates remained, including age distributions. Women whose boyfriend was their primary spending money source were 50% more likely never to use condoms at 6 and 12 months and less likely to respond to the intervention at 12 months. Women whose boyfriend had been their primary spending money source but found another spending money source were more likely to start using condoms than women who continued. Women whose boyfriends owned cars were more likely never to use condoms.

Conclusions—Receiving spending money from a boyfriend is common among adolescent women in populations targeted by pregnancy and STI prevention interventions, and may undermine interventions' effectiveness. Clinicians and reproductive health interventions need to address females' economic circumstances.

Implications and Contribution—Disadvantaged teenage women who receive spending money from their boyfriends may not explicitly trade unsafe sex for money but are nonetheless more likely to have unsafe sex. Safe sex interventions and clinicians must consider economic factors

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that may interfere with adolescents' practice of safe sex, particularly during an economic recession.

Introduction

Condoms are widely promoted for contraception and sexually transmitted infection (STI) prevention, but only 62% of US adolescents report having used condoms at last intercourse (1). Interventions to increase condom use improve individuals' motivation, knowledge, and self-efficacy to use condoms but have limited effectiveness on condom use (2). Women with less relationship bargaining power, and hence limited ability to insist on safe sex, are particularly at risk of condom non-use (3). Relationship partners' dyadic power appears to be influenced by the resources they contribute (4), both money and large capital investments such as cars. We hypothesize that adolescent females whose boyfriend is their primary source of spending money or whose boyfriend owns a car are more likely never to use condoms.

Some disadvantaged women receive material benefits from their committed relationship partners and may thus be at risk for low dyadic power. Explicitly transactional sex — sex traded directly for money or drugs — is a known risk factor for risky sex (5). Few studies in US populations have investigated long-standing relationships where the economic dimension is implicit rather than explicit (6). Evidence from southern Africa suggests that economic benefits occur in relationships of both disadvantaged and non-disadvantaged women, including university students (7), and that some women may not use condoms and birth control to avoid jeopardizing their relationships' economic benefits (8–11). Some African women receiving economic benefits from their relationships describe coercion in sexual relationships as normal (12). Other women claim to avoid partner coercion and describe economic benefits as empowering economic opportunities (13, 14). Conversely, African women who are economically empowered relative to their partners have greater bargaining power (15), higher condom use (16, 17), and lower HIV risk (18, 19). Relationship power differentials have been identified as a factor in HIV spread in Africa (6, 20), and several interventions in Africa have succeeded in increasing stigma for intergenerational and power-disparate sexual relationships (21). These issues have not been studied extensively in the US. Based on the research from southern Africa, we hypothesize that disadvantaged adolescent women whose boyfriends are their primary source of spending money are more likely never to use condoms than women who receive spending money from other sources.

This research tests hypotheses that teen women who receive spending money from their boyfriends are more likely never to use condoms and to not respond to an effective safe-sex intervention. Among women whose initial primary source of spending money was their boyfriend, we also test a hypothesis that women who change to another primary source of spending money are more likely to start using condoms than if their boyfriend continues to be their primary source of spending money. A car is a large investment, particularly for urban adolescents, so this research also tests the hypothesis that female adolescents whose boyfriends own a car are more likely never to use condoms. This research is unique for using propensity score weighting to minimize confounding.

Methods

Theoretical models

This study is guided by the theories of money and commodities by Lee Rainwater and Michael Walzer who hypothesized that full membership in modern industrial societies requires deploying money for consumer goods beyond the level of subsistence (22, 23).

Relationship partners receive decision-making precedence proportional to the resources that they bring to their relationships, according to theories of sociology of the family (4). Together, these theories predict that boyfriends who own cars or give spending money to their girlfriends will have greater power within relationships, and some boyfriends will use that power to promote condom non-use.

Data

We evaluated these hypotheses using data from the study of Horizons, an HIV prevention intervention for African-American females in urban Atlanta. From March 2002 through August 2004, the study enrolled low SES African-American adolescent women ages 15–21 at 3 clinics: a publicly funded STI clinic, a teen clinic based in a large public hospital, and a family planning clinic. Respondents answered surveys at baseline (n=715), 6 months (wave 2, n=607), and 12 months (wave 3, n=605) (24). Unmarried African-American females were eligible to participate if they were sexually active in the past 60 days and neither pregnant nor attempting pregnancy: 847 participants were eligible, of whom 84% agreed to participate. At baseline, 83.6% of respondents reported having a boyfriend, as did 76.8% at 6 months and 72.4% at 12 months. At baseline, 4 of the 715 participants had children whom they lived with. At each of the three waves, a 40-minute interview was administered via audio computer-assisted subject interviewing, and participants were tested for chlamydia, gonorrhea, and trichomoniasis using nucleic-acid-based metrics. Participants were paid $50 upon completion of each survey. Emory University’s Institutional Review Board approved the study protocol prior to implementation.

Measures

Condom non-use represents no attempt to protect against STIs and, for the 85% of the sample who do not use hormonal contraceptives, pregnancy. This study’s primary outcomes were having not used condoms in the past 14 days and past 60 days, at waves 2 and 3. Condom non-use was measured with 3 questions for the past 14 and 60 days: whether the respondent had sex in the last 14 (60) days, how many times, and “Out of the X times you’ve had vaginal sex, in the past 14 (60) days, how many times did you use a condom?” Respondents who reported having had vaginal sex in the past 14 (60) days but having used condoms 0 times were coded as having not used condoms in the past 14 (60) days.

Women’s primary spending money source is the answer to the question “Where do you get most of your spending money?” with possible answers: job, allowance from parents, TANF/public assistance, boyfriend, school/loans/work study, friends, other family, or other. The survey did not define the term “spending money.” Boyfriend and respondent car ownership were assessed with yes/no questions: “Does your boyfriend have a car?” and “Do you have a car?”

The survey defined a boyfriend as a committed sexual relationship partner and casual partners as non-committed sexual partners. We compared women who responded that their boyfriend was their primary source of spending money with women who selected any of the other sources of spending money.

Data Analysis

Data analysis used Stata SE version 11.

Propensity score weighting motivation

Matched sampling is a nonparametric method for reducing confounding by comparing a set of respondents with a characteristic with similar respondents who lack that characteristic. The respondents with the characteristic are analogous to the treatment group in a randomized experiment, and the respondents without the characteristic are analogous to the control group.

Women whose boyfriends are their primary source of spending money may differ from women with other spending money sources, potentially confounding any associations between condom non-use and receiving spending money. Regression analysis attempts to reduce confounding but relies on assumptions that are rarely satisfied, so confounding remains after regression analysis (25, 26). Several matched sampling methods could minimize confounding. This study uses propensity score weighting because it preserves sample size and thus power better than other matched sampling methods (27). After weighting, the only observable difference between groups will be the source of spending money.

Formulation of propensity score models

The predictors in the propensity model are potential confounders of the relationship between spending money source and never using condoms at 6 and 12 months (28), including never using condoms at baseline.

A second propensity score model was formulated among the 173 women whose boyfriends were their primary spending money source at baseline, to predict which women would discontinue having their boyfriend as their primary spending money source at 6 months.

A third propensity model was formulated to predict which women are likely to have at 6 months a boyfriend who owns a car, and likewise predicting propensity to have a boyfriend at 12 months who owns a car.

Potential confounders

Factors are considered potential confounders in this study if they satisfy two criteria: first, they differ between women receiving spending money from boyfriends, the “treatment” group (n=173), and women receiving spending money from another source, the “control” group (n=542); second, these factors either (a) are associated with condom non-use in past research or (b) predict condom non-use according to the National Institute of Mental Health integrated health behavior model (29). We describe potential confounders, how they may confound the relationship between spending money source and condom use, and why the two groups must be balanced on these factors.

Irrespective of parent socioeconomic status, adolescent women with greater human and financial capital (measured by last grade completed in school, employment status, and high school graduation) may be less likely to receive money from boyfriends and more likely to use condoms.

Women with greater potential relationship inequality may be more likely to receive money from boyfriends and less likely to use condoms (3). Related potential confounders include baseline condom non-use and history of abuse or forced sex; greater potential relationship inequalities, such as greater age difference with boyfriend; more permissive sexual norms, such as more lifetime partners; and risk-taking propensity indicated by cigarette and marijuana use.

Women in more committed, monogamous relationships (measured by number of months in relationship, concurrent casual partners, prediction of relationship’s future, and whether the relationship has broken up recently) may be more likely to receive money and less likely to use condoms due to greater trust.

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We verified that the propensity weighting method balanced the groups on boyfriend-specific factors including boyfriend age, but boyfriend-specific factors were not used in the propensity score regression model because 16% of respondents lacked boyfriends; age would have been missing for these respondents with no logical value to impute.

Propensity score weighting procedure

Matched sampling methods, including propensity score weighting, limit comparisons to the “region of common support,” the set of individuals with overlapping estimated propensity scores because individuals in one group without a counterpart in the other group are not pertinent for comparisons of the two groups (25, 26, 30). Limiting the analysis to the region of common support excluded 20 control respondents who were predicted less likely to receive money from their boyfriends than respondents within the treatment group. These 20 control respondents had estimated propensity scores lower than the minimum estimated propensity score among the treated. One treated subject was predicted to be more likely to receive money from her boyfriend than any subjects within the control group, so was likewise excluded. The 172 remaining respondents whose boyfriends were their primary sources of spending money were given a weight of 1. The remaining 522 control respondents were given a weight of $p^{\wedge}/(1 - p^{\wedge})$, where $p^{\wedge}$ is the estimated propensity score (31, 32). A parallel process was used to implement the other 3 propensity weighting models.

Balance assessment

The goal of propensity weighting is to eliminate significant differences between treatment and control groups so that all statistical comparisons are insignificant ($p > 0.05$.) Distributions of each variable were compared before and after propensity score weighting using the Pearson chi-squared test. The cumulative distributions of age, boyfriend age, and age difference with boyfriend were compared with the chi-squared test to ensure that the groups did not differ in distribution (Table 1).

Regressions to predict never using condoms

The primary outcomes are condom non-use in the past 14 and 60 days, measured at waves 2 and 3, a total of 4 measures of condom non-use. The 3 predictors of interest were having a boyfriend as primary spending money source, changing from a boyfriend to another primary spending money source, and having a boyfriend who owns a car. We performed 12 propensity-weighted Poisson regressions: 4 outcome measures of condom non-use and 3 predictors of interest (Figure 1). To avoid spurious statistical significance due to multiple comparisons, the logistic regression model was formulated in one of the 12 eventual regressions: with outcome condom non-use in the past 14 days measured at wave 2, and predictor having a boyfriend as primary spending money source measured at baseline. The control variables chosen for this regression model were used in the remaining 11 regressions.

To avoid artificially low standard errors, all regressions were clustered by the three clinics from which women were sampled.

The regressions included baseline condom non-use as a predictor. The regressions with outcome wave 3 condom non-use were repeated using wave 2 condom non-use instead of baseline condom non-use, and the results were not substantially different.

The coefficient for the predictor of interest in each propensity-weighted regression represents the estimated average treatment effect on the treated (31). We estimated relative risks using a Poisson working model because estimators from logistic regression are inconsistent when the outcome (here, condom non-use) is not rare; Poisson regression yields consistent and unbiased estimates (33–35).

Results

Receiving money from a boyfriend

At baseline, 24% of respondents said that their boyfriend was their primary source of spending money. Women whose boyfriends were their primary source of spending money were 10 percentage points more likely not to use condoms in the past 14 and 60 days than respondents with non-boyfriend sources of spending money: 31% versus 21% in the past 14 days (Fisher's exact p=0.005) and 25% versus 15% in the past 60 days (Fisher's exact p=0.004). This bivariate association could be confounded. The analysis uses propensity-weighted regressions to minimize confounding.

Compared with women with other primary spending money sources, women whose boyfriend was their primary source of spending money had greater drug and alcohol use, were more likely to test positive for STIs, had experienced more abuse and forced vaginal sex, and had lower economic and educational attainments than other women in the sample (Table 1). They were more likely to report physical and emotional abuse by their boyfriends in the last 60 days; had a larger age gap with their boyfriends; had sex with their current boyfriend more quickly after first meeting; had more frequent and riskier sex, including sex under the influence of drugs or alcohol, with a partner under the influence, and with recently released incarcerated men; and had lower oral contraceptive use (Table 1). Educationally, they were less likely to have graduated high school, plan to graduate high school, or be enrolled in school, but not more likely to be behind in school; less likely to work or have a car, but employed women did not differ in hours worked or hourly wage. They were not more likely to be in households receiving public assistance.

Achieving covariate balance with propensity score weighting

The propensity score model for having the boyfriend as a primary source of spending money included 11 variables significant at the 0.05 level (Table 2).

The goal of matching is to make the groups comparable, and having all evaluated differences insignificant implies that the groups do not differ on average on any of the 81 evaluated variables. After propensity score weighting, all 81 evaluated differences were insignificant ($p > 0.05$) (Table 1). Cumulative age distributions also did not differ for respondent age, boyfriend's age, or age difference with boyfriend (Table 1).

Predicting condom non-use in the propensity-weighted sample

At baseline, 27% (21%) of all respondents reported not using condoms in the past 14 days (60 days). Women whose boyfriends were their primary source of spending money were more likely never to use condoms than if they received money from another source, adjusting for 11 covariates and weighted by propensity to receive money from a boyfriend (Figure 1, Table 3.) Respondents randomly assigned to the Horizons intervention had lower rates of condom non-use at 6 months (both among all respondents and respondents receiving money from a boyfriend); and at 12 months among all respondents, but not among respondents receiving money from a boyfriend (Table 3, Table 4).

Among the 173 women who received most of their spending money from boyfriends at baseline, women who changed to a non-boyfriend spending source were less likely never to use condoms at wave 2, but not wave 3, after adjusting for baseline condom use and weighting by propensity to discontinue money (Figure 1).

Boyfriend's car ownership

At all three waves, about 40% of all respondents say that they have a boyfriend who owns a car. After propensity score weighting, no differences were observed between respondents with car-owning boyfriends and respondents with boyfriends without cars or without boyfriends (not shown). Respondents with car-owning boyfriends were 30–50% more likely never to use condoms than if they did not have boyfriends with cars (Figure 1). Restricting to respondents who owned cars at wave 2 (n=87) and wave 3 (n=89), the results were mixed: car-owning respondents with car-owning boyfriends were twice as likely never to use condoms at wave 3 than car-owning respondents without car-owning boyfriends, but no difference was observed at wave 2 (Figure 1).

Discussion

Adolescent women whose boyfriend is their primary source of spending money may not explicitly exchange risky sex for money, but their relationships may be implicitly transactional. Women who received most of their spending money from boyfriends were more likely not to use condoms than if they had received spending money from another source, but women who discontinued receiving most of their spending money from their boyfriend were more likely to start using condoms.

Women whose boyfriends owned cars were also more likely never to use condoms than if their boyfriends did not own cars. For women who owned cars, this difference was attenuated, which is consistent with theory of resource contribution: if both partners own cars, a boyfriend's car does not represent a resource disparity unless it is higher quality.

These differences are consistent with sociology of family theories that state that partners' decision-making precedence is proportional to the economic resources that they contribute to the relationship (4). Resource disparities such as spending money and car ownership may change relationship power balance and alter teen women's safe sex choices.

Qualitative research has found that in relationships with power imbalances, women may not use condoms due to partner coercion (37, 38), to avoid losing spending money (7), to deepen relationships, either intangibly through trust implicit in condom non-use (38), or tangibly through pregnancy if they consciously or unconsciously interpret resources as signaling ability to support children (39).

Condom non-use is likely not attributable to relationship closeness or other relationship factors. Propensity weighting balanced the groups on baseline relationship factors, and wave 2 and 3 relationship factors did not predict condom use in propensity-weighted regressions.

Age disparities are recognized as a source of inequality in adolescents' committed relationships. This work implies that boyfriend-girlfriend dyads with resource disparities but no age difference are more likely to have unsafe sex. Propensity weighting allowed us to compare groups with similar age distributions.

Women who received spending money from their boyfriends were not from more impoverished backgrounds than women who did not, nor did they have lower self-efficacy or condom self-efficacy. The spending money may be used for consumer goods for social standing, as in Africa (7, 13). While not essential for survival, these consumer goods may be perceived as necessary for full membership in the U.S. consumerist society (22, 23).

Receiving money from a boyfriend could undermine interventions that attempt to improve women's ability to negotiate safe sex. In the full sample, the Horizons intervention reduced condom non-use. Among women whose boyfriends were their primary spending money source, Horizons was effective at 6 months but not 12 months. For women receiving money from boyfriends, the failure to persist at 12 months suggests that interventions must address economic factors to have long-term impact.

Limitations

The propensity weighting method may be sensitive to model formulation, but this propensity weighting achieved the required covariate balance, so additional optimization likely would not have improved balance (31).

These results were found among HIV prevention program participants and may not generalize to all adolescents.

The study excluded women trying to become pregnant, but participants may have concealed their fertility preferences to enter the study; condom non-use may have been intentional rather than due to boyfriend coercion.

Implications for policy and practice

Clinicians may be more effective in their safe sex counseling if they consider economic factors. Clinicians can ask adolescents about their primary sources of spending money, remind adolescents of the tangible and intangible resources that they bring to a relationship, provide guidance about when to decline offered gifts, and guide patients to obtain social goods outside of romantic relationships.

Interventions can encourage communities to monitor and speak against unequal relationships, as has been done in Uganda with a social media campaign against age discrepant relationships with exchange of significant economic resources (21). Safe sex interventions seem to be less effective among young women whose primary spending money sources are their boyfriends. Safe sex programs that empower participants economically may be more effective. Randomized experiments with conditional and unconditional cash transfer programs in Africa suggest that providing money to young women decreases sexual risk-taking (40).

Conclusions

Safe-sex interventions may be undermined if adolescent women receive spending money from their boyfriends. Clinicians and safe sex interventions should consider that adolescents who receive spending money from their boyfriends may be at risk for coercive relationships or unsafe sex.

Acknowledgments

The authors thank Jeanne Brooks-Gunn, Jonathan Ellen, Charles Horn, Susan Kegeles, Carl Latkin, Willi McFarland, Clea McNeely, Katherine Newman, James Rosenbaum, Dan Scharfstein, Daniel Liam Singer, Freya Sonenstein, Donna Strobino, Elizabeth Stuart, Mark Tisdahl, and Laurie Zabin for helpful conversations, as well as the participants at seminars at the Johns Hopkins Biostatistics Department's Causal Inference Working Group, Planned Parenthood of California, and the University of Massachusetts Statistics Department.

This research was funded by T-32 AI050056 from the Sexually Transmitted Diseases Division of the Centers for Disease Control and Prevention (Dr. Zenilman.) The data collection was funded by R01 MH061210 from the Center for Mental Health Research on AIDS, National Institute of Mental Health, Bethesda, Maryland (Drs DiClemente and Wingood).

Abbreviations

STI	sexually transmitted infection

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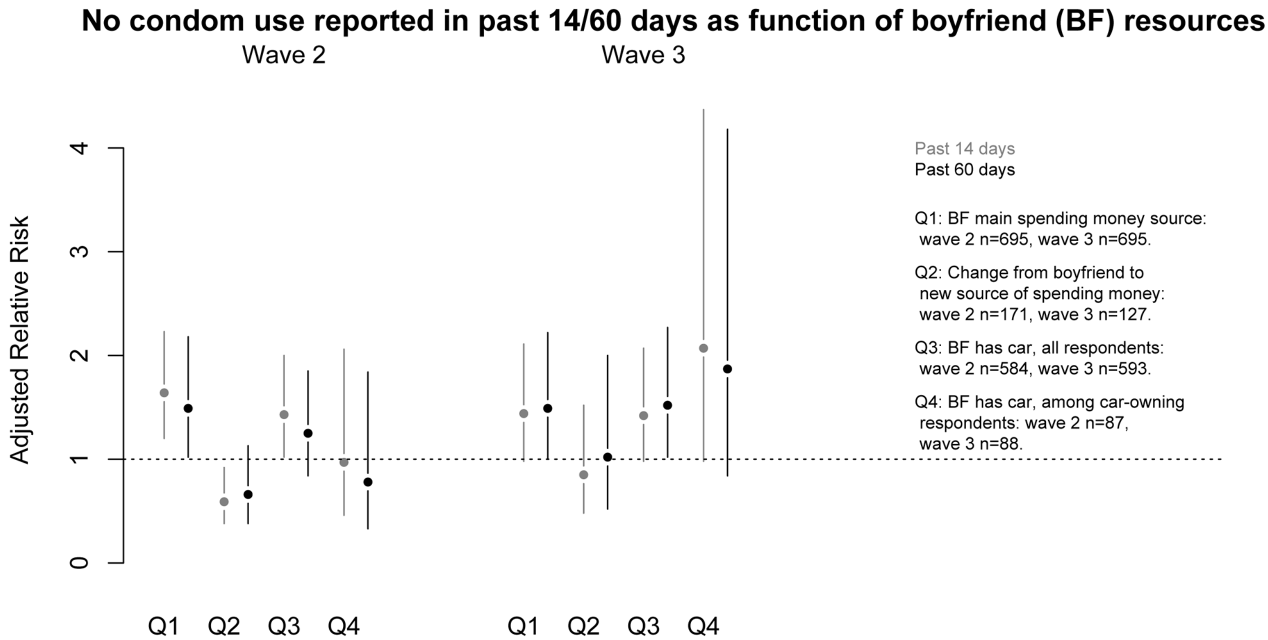

Figure 1.

Adjusted relative risk of not using condoms in the past 14 and 60 days as a function of boyfriend resources, giving the average treatment effect on the treated. The boyfriend resources were: (1) having a boyfriend as primary spending money source at baseline versus having a different primary spending money source at baseline (n=694), (2) among women whose boyfriend was their primary spending money source at baseline (n=173), changing to another primary spending money source at wave 2 versus keeping boyfriend as primary spending money source (n=173), (3) having a boyfriend who owns a car versus not having a boyfriend who owns a car (n=596 at wave 2, n=509 at wave 3); (4) among women who own cars, having a boyfriend who owns a car versus not having a boyfriend who owns a car (n=87 at wave 2, n=89 at wave 3). Adjusted relative risks were computed from the coefficients in propensity-weighted Poisson regressions. The propensity weights (1) estimated the likelihood of having a boyfriend as primary spending money source at baseline; (2) estimated the likelihood of discontinuing spending money at wave 2; and (3) (4) estimated the likelihood of having a boyfriend who owns a car. All regressions adjusted for relationship length, concurrent partners, oral contraceptive use, and intervention status. Regressions (3) and (4) also adjusted for having a boyfriend as primary spending money source.

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Table 1

Background characteristics at baseline, comparing women whose boyfriend is her primary source of spending money at baseline with women whose spending money at baseline comes from another source, before and after propensity score weighting. The goal of propensity score weighting is to make all differences between the two groups have $p > 0.05$. Factors are sorted within category in order of p-value prior to matching. Age differences may affect power between women and their boyfriends, so ages are compared both in cumulative distribution and in mean.

All factors measured at baseline						
	Before weighting			After weighting		
	Source of money			Source of money		
	Boyfriend (n=173)	Other (n=542)	p	Boyfriend (n=172)	Other (n=522)	p
Assigned intervention	52.0	47.6		52.3	49.9	
Personal background						
Ever physically abused	56.6	44.1	**	56.4	60.8	
Ever forced to have vaginal sex	31.2	22.7	*	31.2	25.3	
Ever forced sex	31.2	22.7	*	31.4	27.3	
Ever emotionally abused	65.9	59.6		65.7	66.0	
Current age (years)	17.8	17.8		17.8	17.9	
Self-esteem (0 to 1)	0.77	0.78		0.77	0.76	+
Neighborhood quality	0.79	0.81		0.79	0.79	
Stress	0.40	0.40		0.40	0.40	
Coping	0.34	0.36		0.34	0.36	
Residence						
Live with boyfriend	17.1	6.7	****	17.2	17.9	
Live alone	4.0	10.1	*	4.1	8.2	
Live with roommate/friends	2.9	6.6	+	2.9	4.4	
Live with parent	59.0	62.0		58.7	53.6	
Live with older family	75.7	75.8		75.6	68.3	
Live with children	0.6	0.7		0.6	1.0	
STIs						
Trich, positive test	17.3	11.4	*	16.9	18.6	
Prior STIs	51.4	41.7	*	51.7	42.0	+
Gonorrhea, positive test	7.5	4.1	+	7.6	11.5	
Chlamydia, positive test	22.0	16.2	+	22.1	22.6	

	All factors measured at baseline					
	Before weighting			After weighting		
	Source of money			Source of money		
	Boyfriend (n=173)	**Other (n=542)**	**p**	**Boyfriend (n=172)**	**Other (n=522)**	**p**
Bacterial vaginosis	12.1	10.9		12.2	11.9	
Education						
High school drop-out	28.3	17.0	***	27.9	30.8	
Plan graduate high school	53.2	67.2	***	53.4	50.2	
Enrolled post-secondary school	9.2	17.7	**	9.3	8.1	
High school graduate	9.3	17.9	**	9.4	8.1	
High school student	45.7	50.9		45.9	44.7	
Age - last grade completed (years)	7.1	7.1		7.1	7.2	
Personal money						
Have a job	17.3	33.2	****	17.4	19.1	
Have car	6.4	15.5	**	6.4	6.8	
Past year TANF or SSI	12.1	19.2	*	12.2	12.8	
Past year any public assistance	57.8	50.4	+	57.6	55.8	
Past year food stamps	43.9	38.0		43.6	41.4	
Eligible for free STI care	66.5	62.2		66.3	64.4	
No. hours work per week (n=210)	25.9	25.8		25.9	28.3	
Hourly pay (dollars) (n=210)	7.00	6.84		7.00	6.90	
Total earnings (dollars) (n=210)	189	179		189	198	
Boyfriend (n=596)						
Have a boyfriend	94.8	80.1	****	94.8	94.5	
Boyfriend makes more money	70.1	51.4	****	69.9	70.9	
Boyfriend age	22.0	20.3	****	22.0	22.0	
Age difference (years)	4.3	2.6	****	4.3	4.1	
Boyfriend has job	78.0	63.6	***	77.9	77.3	
Boyfriend emotional abuse	19.5	11.5	**	19.0	22.2	
Time to sex (weeks)	10.0	12.3	*	10.1	11.6	
Boyfriend physical abuse	11.0	6.0	*	11.0	13.0	
Boyfriend has car	56.1	47.2	*	56.4	48.2	

	All factors measured at baseline					
	Before weighting			After weighting		
	Source of money			Source of money		
	Boyfriend (n=173)	Other (n=542)	p	Boyfriend (n=172)	Other (n=522)	p
Boyfriend any concurrent partners	29.9	26.0		29.4	31.9	
Casual partner	28.7	25.1		28.2	29.2	
Boyfriend has casual partner	28.7	25.1		28.2	29.2	
Boyfriend relationship quality						
See marrying current boyfriend (0 to 1)	0.71	0.65	**	0.71	0.66	
Months with boyfriend	17.4	14.4	**	17.3	16.4	
Future of relationship (0 to 1)	0.67	0.63		0.67	0.66	
Partner communication (0 to 1)	0.82	0.82		0.83	0.82	
Partner communication frequency (0 to 1)	0.46	0.42		0.46	0.45	
Recently broke up with boyfriend	40.9	43.3		41.1	45.1	
Sexual risks						
No. times sex, last 60d	15.5	10.7	****	15.5	14.9	
Ever douche	72.3	56.8	****	72.1	65.4	
Sex with high partner, last 60d (num. days)	4.3	2.2	****	4.3	4.1	
Sex with recently released incarcerated	26.0	14.2	****	26.2	22.4	
Sex while high/drunk, last 60d (no. days)	3.4	1.7	****	3.4	5.6	
Douche, past 60 d	2.0	0.9	**	2.0	1.4	
No. times sex, last 14 d	4.9	3.7	**	4.9	3.9	
On oral contraception	9.2	16.6	*	9.3	9.2	
Ever HIV test	86.7	79.0	*	87.2	85.0	
Lifetime no. partners	10.9	7.9	+	11.0	9.6	
Ever oral sex	63.0	55.9	+	62.8	60.9	
Partners past 60 days	1.5	1.6		1.5	1.9	
Sexual adventurism (0 to 1)	0.33	0.31		0.32	0.31	+
Lack of condom self-efficacy (0 to 1)	0.16	0.18		0.16	0.16	
Condom effectiveness (0 to 1)	0.48	0.51		0.48	0.49	
Refusal efficacy (0 to 1)	0.70	0.70		0.70	0.70	
Age first sex	14.4	14.6		14.4	14.4	

	All factors measured at baseline					
	Before weighting			After weighting		
	Source of money			Source of money		
	Boyfriend (n=173)	Other (n=542)	p	Boyfriend (n=172)	Other (n=522)	p
Pleasure from sex (0 to 1)	0.85	0.83		0.85	0.85	
Ever sex with 2 men	6.9	4.3		7.0	7.4	
Ever anal sex	28.9	23.0		28.5	27.4	
Substance use						
Marijuana, no. days/60	14.6	7.0	****	14.4	16.1	
Any marijuana past 60 d	56.1	41.3	***	55.8	56.7	
Smoke	31.8	20.3	**	31.4	37.8	
Ever marijuana	84.4	77.3	*	84.3	82.5	
Any alcohol past 60 days	63.0	52.4	*	62.8	61.5	
Alcohol past 60 days	4.6	3.6	+	4.5	5.2	
Usual no. alcoholic drinks	1.2	1.0	*	1.2	1.2	
Age						
Age ≤15	9.8	10.9		9.9	11.6	
Age ≤ 16	23.7	25.7		23.8	25.6	
Age ≤ 17	45.1	45.6		45.4	42.3	
Age ≤ 18	65.3	65.1		65.1	62.0	
Age ≤ 19	85.0	81.7		84.9	82.6	
Age ≤ 20	94.8	92.1		94.8	93.0	
Boyfriend age						
Boyfriend age ≤ 15	1.2	1.4		1.2	0.01	
Boyfriend age ≤ 16	4.9	7.8		4.9	4.4	
Boyfriend age ≤ 17	11.6	20.1	*	11.7	12.7	
Boyfriend age ≤ 18	25.0	37.6	**	25.2	29.8	
Boyfriend age ≤ 19	37.8	51.6	**	38.0	38.7	
Boyfriend age ≤ 20	47.0	60.8	**	47.2	44.8	
Boyfriend age ≤ 21	57.3	71.9	***	57.1	57.9	
Boyfriend age ≤ 22	62.2	80.2	****	62.0	69.0	
Boyfriend age ≤ 23	70.1	83.9	***	69.9	72.8	

All factors measured at baseline						
	Before weighting			After weighting		
	Source of money			Source of money		
	Boyfriend (n=173)	Other (n=542)	p	Boyfriend (n=172)	Other (n=522)	p
Boyfriend age ≤ 24	76.8	87.8	***	76.7	78.1	
Boyfriend age ≤ 25	83.5	91.9	**	83.4	82.3	
Boyfriend age ≤ 26	87.8	94.5	**	87.7	85.1	
Boyfriend age ≤ 27	90.2	95.2	*	90.2	87.4	
Boyfriend age ≤ 28	93.3	97.0	*	93.3	91.7	
Boyfriend age ≤ 29	95.1	97.2		95.1	91.8	
Boyfriend age ≤ 30	95.7	97.7		95.7	92.6	
Age difference with boyfriend						
Boyfriend is ≤ 0 years older	12.8	10.2		10.3	8.1	
Boyfriend is ≤ 1 years older	26.5	33.2	+	26.7	27.6	
Boyfriend is ≤ 2 years older	38.1	51.9	**	38.4	42.8	
Boyfriend is ≤ 3 years older	49.7	69.6	****	50.0	57.3	
Boyfriend is ≤ 4 years older	64.0	78.3	***	63.7	64.3	
Boyfriend is ≤ 5 years older	74.2	84.0	**	74.0	72.2	
Boyfriend is ≤ 6 years older	81.6	87.5	+	81.5	75.5	
Boyfriend is ≤ 7 years older	85.0	91.6	*	84.9	82.0	
Boyfriend is ≤ 8 years older	86.4	93.5	**	86.3	84.9	
Boyfriend is ≤ 9 years older	89.8	96.5	**	89.7	89.6	
Boyfriend is ≤ 10 years older	93.2	96.7	+	93.2	89.6	

+ $p \leq 0.1$,

* $p \leq 0.05$,

** $p \leq 0.01$,

*** $p \leq 0.001$,

**** $p \leq 0.0001$

Table 2

Logistic regression model to estimate propensity scores with the dichotomous outcome that primary source of spending money is boyfriend (n=715). All variables are from wave 1.

	Odds ratio	95% CI	p
Boyfriend makes more money	2.40	(1.60, 3.63)	****
Family receives TANF/SSI	0.24	(0.13, 0.46)	****
No. times used marijuana past 60 days	1.02	(1.01, 1.03)	****
Work for pay	0.41	(0.25, 0.68)	***
Months with boyfriend	1.05	(1.01, 1.09)	**
Months with boyfriend, squared	0.999	(0.999, 1.000)	+
Have a car	0.36	(0.17, 0.79)	**
Live with boyfriend	2.33	(1.23, 4.41)	*
Future of relationship, scale	1.07	(1.01, 1.13)	*
Plan to graduate hs or already did	0.62	(0.41, 0.95)	*
Positive test for CT, GC, trich	1.58	(1.03, 2.41)	*
Family receives any public assistance	1.59	(1.04, 2.41)	*
Ever physically abused	1.45	(0.97, 2.16)	+
Birth control pill	0.58	(0.31, 1.10)	
Broke up in the past 6 months	0.71	(0.47, 1.08)	
Never use condoms in past 60 days	1.45	(0.91, 2.29)	

+ $p \leq 0.1$,

* $p \leq 0.05$,

** $p \leq 0.01$,

*** $p \leq 0.001$,

**** $p \leq 0.0001$

Outcome and all covariates at wave 1. P is from z-test.

Table 3

Results from 4 propensity-weighted regressions with outcome having not used condoms in the past 14 and 60 days during vaginal sex, at waves 2 and 3 (n=695). Adjusted relative risks are approximated with a Poisson working model.

Outcome at wave 2: Never use a condom in the past…				
	14 days		**60 days**	
	Relative Risk, 95% CI	**p**	**Relative risk, 95% CI**	**p**
Money from boyfriend, wave 2	1.64 (1.20, 2.22)	**	1.49 (1.02, 2.18)	*
Never use condom, wave 1	1.81 (1.34, 2.44)	****	2.05 (1.43, 2.94)	****
Relationship length, wave 2	1.04 (1.01, 1.08)	*	1.05 (1.00, 1.09)	*
Relationship length squared, wave 2	0.999 (0.998, 1.000)	*	0.999 (0.999, 1.000)	+
Same boyfriend, wave 2	2.13 (1.28, 3.56)	**	1.99 (1.04, 3.81)	*
Respondent has casual partner, wave 2	1.36 (0.45, 4.13)		0.52 (0.11, 2.38)	
Boyfriend has casual partner, wave 2	0.67 (0.20, 2.25)		1.38 (0.27, 6.97)	
Respondent takes oral contraception, wave 2	1.05 (0.60, 1.83)		0.99 (0.58, 1.71)	
Intervention	0.74 (0.54, 1.01)	+	0.54 (0.36, 0.79)	**
Outcome at wave 3: Never use a condom in the past…				
	14 days		**60 days**	
	Relative Risk, 95% CI	p	Relative risk, 95% CI	p
Money from boyfriend, wave 3	1.44 (0.98, 2.11)	+	1.49 (1.00, 2.22)	*
Never use condom, wave 1	1.67 (1.16, 2.40)	**	2.09 (1.38, 3.16)	****
Relationship length, wave 3	1.04 (1.01, 1.07)	*	1.04 (1.01, 1.07)	**
Relationship length squared, wave 3	0.999 (0.999, 1.000)	+	0.999 (0.999, 1.000)	+
Same boyfriend, wave 3	0.87 (0.53, 1.40)		0.87 (0.51, 1.46)	
Respondent has casual partner, wave 3	0.64 (0.27, 1.54)		0.71 (0.25, 2.00)	
Boyfriend has casual partner, wave 3	1.28 (0.48, 3.44)		1.18 (0.37, 3.76)	
Respondent takes oral contraception, wave 3	1.08 (0.59, 1.99)		1.14 (0.65, 2.01)	
Intervention	0.56 (0.38, 0.82)	**	0.54 (0.36, 0.82)	**

+ $p \leq 0.1$,

* $p \leq 0.05$,

** $p \leq 0.01$,

*** $p \leq 0.001$,

**** $p \leq 0.0001$

Regression results (n=695), inverse propensity score weighted. Relationship length is in months, both linear and quadratic terms. P is from z-test.

Table 4

Effectiveness of Horizons intervention among women whose boyfriends are their primary sources of spending money. Results from 4 propensity-weighted regressions with outcome having not used condoms in the past 14 and 60 days during vaginal sex, at wave 2 (n=141) and wave 3 (n=127). Adjusted relative risks are approximated with a Poisson working model.

Outcome at wave 2: Never use a condom in the past…				
	14 days		**60 days**	
	Relative Risk, 95% CI	**p**	**Relative risk, 95% CI**	**p**
Horizons intervention	0.63 (0.43, 0.94)	*	0.38 (0.21, 0.68)	***
Never use condom, wave 1	1.50 (1.05, 2.14)	*	1.70 (1.05, 2.77)	*
Relationship length, wave 2	1.00 (0.98, 1.01)		1.00 (0.98, 1.02)	
Same boyfriend, wave 2	1.48 (0.94, 2.33)	+	1.79 (0.91, 3.52)	+
Respondent has casual partner, wave 2	0.68 (0.36, 1.30)		0.66 (0.28, 1.59)	
Respondent takes oral contraception, wave 2	1.50 (0.82, 2.74)		1.42 (0.64, 3.13)	
Outcome at wave 3: Never use a condom in the past…				
	14 days		**60 days**	
	Relative Risk, 95% CI	p	Relative risk, 95% CI	p
Horizons intervention	0.87 (0.53, 1.42)		0.82 (0.49, 1.38)	
Never use condom, wave 1	1.87 (1.16, 3.00)	**	2.08 (1.25, 3.47)	**
Relationship length, wave 3	1.01 (0.99, 1.02)		1.01 (1.00, 1.03)	*
Same boyfriend, wave 3	0.74 (0.43, 1.27)		0.71 (0.39, 1.31)	
Respondent has casual partner, wave 3	0.44 (0.21, 0.92)	*	0.40 (0.19, 0.84)	*
Respondent takes oral contraception, wave 3	1.11 (0.43, 2.85)		1.51 (0.71, 3.25)	

+ $p \leq 0.1$,

* $p \leq 0.05$,

** $p \leq 0.01$,

*** $p \leq 0.001$,

**** $p \leq 0.0001$

Relationship length is in months. P is from z-test. To compensate for loss of power due to restriction to the subsample of women whose boyfriends are their primary spending money sources, these regressions do not include two colinear factors present in previous regressions: quadratic term for relationship length and the dichotomous factor boyfriend has casual partner. All respondents who reported that their boyfriends had casual partners reported having casual partners themselves.